

Notice of Allowability

Application No.

10/649,431

Applicant(s)

WISLER ET AL.

Examiner

Albert K. Wong

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2635

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the application filed 8/27/2003.
2. ☒ The allowed claim(s) is/are 1-51.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date ____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date ____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other ____. |

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1. This Office action is in response to the application filed August 27, 2003. Claims 1-51 are pending.

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR

1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Patrick McCollum on December 20, 2005.

The application has been amended as follows:

1. (Currently amended) A telemetry system for transmitting an electromagnetic signal within a borehole, the system comprising:

- (a) a borehole EM transceiver;
- (b) a surface EM transceiver; and
- (c) a signal wire with a first end comprising electrode means connected within said borehole to the outer surface of a tubular, and a second end electrically connected to said surface EM transceiver; wherein
- (d) said signal wire reduces attenuation of said signal transmitted between said surface EM transceiver and said borehole EM transceiver.

3. (Currently amended) The telemetry system of claim 2 wherein said signal wire is disposed in the annulus between said tubular and the wall of said borehole.

4. (Currently amended) The telemetry system of claim 3 wherein said first end of said signal wire is connected near the lower end of said tubular.

5. (Currently amended) The telemetry system of claim 3 where said first end of said signal wire is electrically connected to the outer surface of said tubular.

6. (Currently amended) The telemetry system of claim 3 where said first end of said signal wire is mechanically connected to the outer surface of said tubular.

10. (Currently amended) The telemetry system of claim 3 wherein said first end of said signal wire is affixed to an electrode structure that is electrically insulated from said tubular by a non conducting section of tubular.

15. (Currently amended) A measurement-while-drilling system for measuring a parameter of interest, said system comprising:

(a) a downhole assembly comprising a sensor, wherein said downhole assembly is terminated at a lower end by a drill bit and at an upper end by a drill string operationally attached to a drilling rig;

(b) an electromagnetic telemetry system for transmitting an electromagnetic signal indicative of a response of said sensor, said telemetry system comprising

(i) a surface EM transceiver for receiving said signal,

(ii) a borehole EM transceiver for transmitting said signal wherein said borehole EM transceiver is disposed within said downhole assembly and operationally connected to said sensor, and

(iii) a signal wire with a first end comprising electrode means connected within said borehole to the outer surface of a casing string, and a second end electrically connected to said surface EM transceiver; and

(c) a processor cooperating with said surface EM transceiver by means of a link to convert said signal into said parameter of interest; wherein

(d) said signal wire reduces attenuation of said signal transmitted between said surface EM transceiver and said borehole EM transceiver.

26. (Currently amended) A method for transmitting an electromagnetic signal within a borehole, the method comprising:

(a) providing a borehole EM transceiver;

- (b) providing a surface EM transceiver; and
- (c) reducing attenuation of said signal transmitted between said borehole EM transceiver and said surface EM transceiver by connecting a first end of a signal wire within said borehole to the outer surface of a tubular, and electrically connecting a second end of said signal wire to a terminal of said surface EM transceiver.

28. (Currently amended) The method of claim 27 comprising the additional step of disposing said signal wire in the annulus defined by an outer surface of the tubular and the wall of said borehole.

29. (Currently amended) The method of claim 27 comprising the additional step of connecting said first end of said signal wire near the lower end of said tubular.

30. (Currently amended) The method system of claim 27 where said first end of said signal wire is electrically connected to the outer surface of said tubular.

31. (Currently amended) The method of claim 27 where said first end of said signal wire is mechanically connected to the outer surface of said tubular.

35. (Currently amended) The method of claim 26 comprising the additional step of affixing said first end of said signal wire to an electrode structure that is electrically insulated from said tubular by a non-conducting section of tubular.

40. (Currently amended) A method for measuring a parameter of interest while drilling a borehole, said method comprising:

- (a) providing a downhole assembly comprising a sensor;
- (b) terminating said downhole assembly at lower end with a drill bit and at an upper end by a drill string operationally attached to a drilling rig;
- (c) advancing said borehole with said drill bit by rotating motion imparted to said bit;

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- (d) providing an electromagnetic telemetry system for transmitting an electromagnetic signal indicative of a response of said sensor, said telemetry system comprising
 - (i) a surface EM transceiver for receiving said signal,
 - (ii) a borehole EM transceiver for transmitting said signal wherein said borehole EM transceiver is disposed within said downhole assembly and operationally connected to said sensor, and
 - (iii) a signal wire with a first end connected within said borehole to the outer surface of a casing string, and a second end electrically connected to a terminal of said surface EM transceiver;
- (e) reducing attenuation of said signal transmitted between said surface EM transceiver and said borehole EM transceiver by use of said signal wire; and
- (f) converting said signal to said parameter of interest with a processor cooperating with said surface EM transceiver by means of a link.

3. The following is an examiner's statement of reasons for allowance: the claims recite an apparatus and method for improving signal transmission within a borehole to the surface by using a signal wire that is connected to the outer surface of a tubular or a casing string by coupling signals from a EM transceiver located within the borehole to a surface EM transceiver. Such a combination is not taught or suggested by the prior art of record. In particular, Titchener teaches a similar communication system, however, the signal wire is not connected to anything within the borehole.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert K. Wong whose telephone number is 571-272-3057. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Horabik can be reached on 571-272-3068. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Albert K. Wong
December 20, 2005

ALBERT K. WONG
PRIMARY EXAMINER